



UNITED STATES PATENT AND TRADEMARK OFFICE

ch

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/605,513	10/05/2003	Chen Ou	KYCP0011USA	2512
27765	7590	06/03/2005	EXAMINER	
NORTH AMERICA INTERNATIONAL PATENT OFFICE (NAIPC)			MONDT, JOHANNES P	
P.O. BOX 506			ART UNIT	
MERRIFIELD, VA 22116			PAPER NUMBER	
			2826	

DATE MAILED: 06/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/605,513

Applicant(s)

OU ET AL.

Examiner

Johannes P. Mondt

Art Unit

2826

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 March 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 and 19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3,4,10 and 11 is/are rejected.
- 7) ☒ Claim(s) 2, 5-9 and 19 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 October 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

Amendment filed 3/17/05 forms the basis of this office action. In said Amendment Applicants substantially amended claims 1-11 at least through substantial amendment to independent claim 1, cancelled claims 12-18 and added new claim 19. Applicants also amended the specification in an apparent attempt to overcome the objection to the drawings as made in the previous office action mailed 11/17/04. Comments on "Remarks" in said Amendment are included below under "Response to Arguments".

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "first conductivity type cladding layer" of claim 8 must be shown (layer between n-contact layer 16 and multiple quantum well light emitting layer 18) or the feature canceled from the claim. No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate

Art Unit: 2826

figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

The following is a quotation from the relevant sections of the Patent Rules under 37 C.F.R. 1.75 that form the basis of the objection made in this office action.

(d)

(1) The claim or claims must conform to the invention as set forth in the remainder of the specification and the terms and phrases used in the claims must find clear support or antecedent basis in the description so that the meaning of the terms in the claims may be ascertainable by reference to the description (see § 1.58(a)).

2. ***Claim 8*** is objected to under 37 C.F.R. 1.75(d) because "the first conductivity type cladding layer" of (original and pending) claim 8 has not been disclosed in the remainder of the specification nor illustrated in any of the drawings. The "first conductivity type cladding layer" must be illustrated and disclosed in the remainder of the text of the specification or any reference to said first conductivity type cladding layer must be removed from the claim language. Appropriate correction is required.

Specification

The following is a quotation from the relevant sections of the Patent Rules under 37 C.F.R. 1.75 that form the basis of the objection made in this office action.

(d)

(1) The claim or claims must conform to the invention as set forth in the remainder of the specification and the terms and phrases used in the claims must find clear support or antecedent basis in the description so that the meaning of the terms in the claims may be ascertainable by reference to the description (see § 1.58(a)).

3. The disclosure is objected to because of the following informalities: the

“first conductivity type cladding layer” as originally claimed (claim 8) should be disclosed in the remainder of the text of the specification or any reference to said first conductivity type cladding layer must be removed from the claim language.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35

U.S.C. 102 that form the basis for the rejections under this section made in this

Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. **Claims 1, 3, 4, 10 and 11** are rejected under 35 U.S.C. 102(e) as being anticipated by Kneissl et al (6,515,308 B1). Kneissl et al teach (Figure 1, title, abstract, and cols. 4-7) a substrate 102 (col. 4, l. 15-18); a light emitting stack structure 108/114/116 (col. 5, l. 1-17) formed over the substrate; a nitride based dual dopant contact layer 126 (col. 6, l. 16-20) formed over the light emitting

Art Unit: 2826

stacked structure, the nitride based dual dopant contact layer comprising a plurality of p-type dopants and a plurality of n-type dopants, inherently so because silicon (Si) is an amphoteric impurity in any III-V semiconductor (see, e.g., M. Fukuda, "Optical Semiconductor Devices", John Wiley & Sons, 1999, p. 12), including GaN; and a transparent conductive oxide layer 130 (col. 7, l. 37-42) formed over the nitride based dual dopant contact layer 126.

On claims 3 and 4: the further limitation as defined by claims 3 and 4 each fail to further limit the structure as claimed, as opposed to the method of making of the structure, and hence fail to distinguish over the prior art, given a single layer is claimed.

On claim 10: the substrate 102 is a conductive substrate, e.g., GaN (N.B.: GaN intrinsically is n-doped and hence conductive: see, e.g., O. Madelung, Semiconductors – Basic Data, 2nd revised edition, Springer Verlag, Berlin 1996), p. 90).

On claim 11: the conductive substrate is made of GaN.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 2826

7. **Claims 1, 3, 4, 10 and 11** are rejected under 35 U.S.C. 103(a) as being unpatentable over Kneissl et al (6,515,308 B1). Kneissl et al teach (Figure 4 and cols. 8-10) a nitride based light-emitting diode comprising: a substrate 102 (col. 4, l. 15-18); a light emitting stack structure 114 (col. 5, l. 1-17) formed over the substrate; a nitride based dual dopant contact layer 126 (col. 9, l. 18-22) formed over the light emitting stacked structure, the nitride based dual dopant contact layer comprising a plurality of p-type dopants and a plurality of n-type dopants, inherently so because silicon (Si) is an amphoteric impurity in any III-V semiconductor (see, e.g., M. Fukuda, "Optical Semiconductor Devices", John Wiley & Sons, 1999, p. 12) including GaN; and a conductive layer 130 (col. 9, l. 38-40) formed over the nitride based dual dopant contact layer 126. Kneissl et al do not necessarily teach in the embodiment of Figure 4 the limitation that said conductive layer 130 is a transparent oxide layer. However, it would have been obvious to include said limitation in view of the first embodiment by Kneissl et al wherein they teach (Figure 1 and cols. 4-7) to cover the whole upper surface of a VCSEL with a transparent oxide layer 130 (col. 6, l. 16-25) contacted by a dual dopant contact layer 126 (loc.cit.). The replacement of the conductive layer 130 of the embodiment of Figure 4 by the surface-covering transparent oxide conductive layer 130 of the embodiment of Figure 1 is an obvious advantage because the transparent oxide transmits light and therefore the extraction efficiency is improved by said replacement. *Motivation* to include the teaching of the second embodiment in the first in this regard thus immediately flows from the resulting increased light yield.

On claims 3 and 4: the further limitation as defined by claim 3 and claim 4 each fail to further limit the structure as claimed, as opposed to the method of making of the structure, and hence fail to distinguish over the prior art, given a single layer is claimed

On claim 10: the substrate 102 is a conductive substrate, e.g., GaN (N.B.: GaN intrinsically is n-doped and hence conductive: see, e.g., O. Madelung, Semiconductors – Basic Data, 2nd revised edition, Springer Verlag, Berlin 1996), p. 90).

On claim 11: the conductive substrate is made of GaN.

Response to Arguments

Substantial amendment of the claims necessitated further search and consideration, which is reflected in the present office action. The objection to the Drawings has not been overcome by amendment to the specification: counter to Applicant's interpretation of the office action the examiner did not note that said first conductivity type cladding layer is defined as 16 but noted instead that 16 is defined to be a contact layer. In the present claim language there are two cladding layers: the first conductivity type cladding of claim 8 and the second conductivity type cladding layer of claim 9. There appears to be only one cladding layer in the specification and the drawings, namely the p-type (second conductivity type) cladding layer located above the multiple quantum well light emitting layer. Therefore, the first conductivity type cladding layer interposed between the contact layer of first conductivity type and the multiple quantum well

Art Unit: 2826

light emitting layer has neither been shown nor disclosed. This office action is based on the above considerations and on results of a search based on the current claim language, conducted at the earliest possible time.

Allowable Subject Matter

8. ***Claims 2, 5-9 and 19***, are objected to as being dependent upon a rejected base claim, but would be allowable *with allowability of claim 8 subject to removal of the above-made objection for minor informalities*, if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

9. The following is a statement of reasons for the indication of allowable subject matter:

With regard to claims 2 and 19: strictly within the context of independent claim 1 a dual dopant contact layer based on AlInGaN has not been found in the art.

With regard to claims 5-9: strictly within the context of independent claim 1, the claimed first and second conductivity type contact layers of AlInGaN as claimed in claim 5 have not been found in the prior art.

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

Art Unit: 2826

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Johannes P. Mondt whose telephone number is 571-272-1919. The examiner can normally be reached on 8:00 - 18:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan J. Flynn can be reached on 571-272-1915. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2826

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JPM
May 20, 2005

NATHAN J. FLYNN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800

